L10: Entry 33 of 34 File: USPT Aug 15, 1995

DOCUMENT-IDENTIFIER: US 5442680 A
TITLE: Dual system cellular cordless radiotelephone apparatus with sub-data channel timing monitor

Drawing Description Text (9):
FIG. 11, 12, and 13 are, together, a flowchart diagramming the process of system priority selection which may be employed in the portable radiotelephone of FIG. 4.

Detailed Description Text (20):
In FIG. 5 the PCC 101 determines whether the user's cellular or landline phone number has call routing priority at block 517. Call routing priority refers to the user's system preference (cellular or landline) to which an incoming call is routed to first before transferring to the second system if the PCC 101 is not located. Since the user is available via both a cellular and landline phone number, it would be convenient to give out only one of the phone numbers to another party to place incoming calls to the user. Thus, a single phone number may be used by the other party to reach the user's PCC 101 in either the cellular or cordless telephone system.

Detailed Description Text (21):
If the cellular phone number has call routing priority, the PCC 101 forwards the cellular phone number to the landline phone number of the cordless base unit at block 519 and waits in the idle state in the cordless telephone system at block 503. Thus, an incoming call routed to the user's cellular phone number is automatically forwarded to the landline phone number of the cordless base station 115 when the PCC 101 is located in the cordless telephone system.

Detailed Description Text (22):
If the user's landline phone number has call routing priority, the PCC 101 sends a call forward message to the cordless base unit instructing it to forward the users landline phone number (sent to the cordless base station) to the landline phone number of the cordless base unit at block 521 and waits in the idle state in the cordless telephone system at block 503. If a call forward message is received by the cordless base station 115, the cordless base station 115 performs a remote call forwarding of the user's landline phone number to the landline phone number of the cordless base station 115 and returns to its idle state. Thus, an incoming call routed to the user's landline phone number is automatically forwarded to the landline phone number of the cordless base station 115 when the PCC 101 is located in the cordless system. If the PCC 101 is turned off the user may still receive incoming calls via any telephone associated with the phone number of the base station.

Detailed Description Text (23):
In FIG. 6 the PCC 101 decides at block 523 whether to remain in its idle state in the cordless telephone system by returning to block 503 or to change to the cellular telephone system 103 by progressing to block 525. At block 525 the PCC 101 determines whether the cellular phone number of the PCC 101 or the user's landline phone number has call routing priority. If the cellular phone number has call routing priority, the PCC 101 sends a cancel call forwarding message to the cellular system and the PCC 101 returns to waiting in the idle state in the cellular system at block 501. Thus, an incoming call routed to the user's cellular phone number directly calls the PCC 101 located in the cellular telephone system 103.

Detailed Description Text (24):

L10: Entry 8 of 34 File: USPT May 15, 2001

DOCUMENT-IDENTIFIER: US 6233463 B1
TITLE: Automatic satellite terrestrial mobile terminal roaming system and method

Detailed Description Text (80):
The Home Location Register (HLR) is a database of user information which is held in the communications system infrastructure independent of the user location. It includes the current location of the user (i.e. which network the user is in, not the physical latitude and longitude of the user). The HLR is typically a stand alone computer, and has subdivisions for handling authentication and security data for authenticating the user. The Visitor Location Register (VLR) is linked to one or more MSCs and temporarily stores data for users currently in the service area of the corresponding MSC(s). The user's current location is generally more precisely known to the VLR than to the HLR. A gateway switch (GMSC) is used to process calls and to handle incoming calls from the PSTN 3. These calls are routed to the GMSC without knowledge of the user location. The user location is fetched and the call is routed to the right MSC. In doing this the GMSC first finds the correct HLR knowing only the directory number of the GSM or IS-41 subscriber, then interrogates the HLR for the user information.

Current US Cross Reference Classification (1):
455/426

CLAIMS:

1. A dual mode user terminal, comprising:

a first transceiver for communicating with a satellite communications network that comprises at least one satellite and at least one terrestrial gateway;

a second transceiver for communicating with a terrestrial cellular communications network comprising at least one repeater and at least one mobile switching center; and

a processor, responsive to one of a user selected protocol or a gateway selected protocol, for enabling either said first or said second transceiver for registering said user terminal with one of said satellite communications network or said terrestrial cellular communications network, wherein one of said satellite communications network or terrestrial cellular communications network is assigned a higher priority than the other for first attempting registration, and wherein said gateway instructs said processor to initiate a registration into the other network after registering with the highest priority network while remaining registered with the highest priority network.

2. A dual mode user terminal, comprising:

a first transceiver for communicating with a satellite communications network that comprises at least one satellite and at least one terrestrial gateway;

a second transceiver for communicating with a terrestrial cellular communications network comprising at least one repeater and at least one mobile switching center; and

a processor, responsive to a gateway selected protocol communicated to said user terminal, for enabling either said first or said second transceiver for registering

said user terminal with one of said satellite communications network or said terrestrial cellular communications network, wherein one of said satellite communications network or terrestrial cellular communications network is assigned a higher priority than the other for first attempting registration, and wherein said processor automatically initiates a registration into the other network after de-registering with the highest priority network.

8. A dual mode user terminal, comprising:

a first transceiver for communicating with a satellite communications network that comprises at least one satellite and at least one satellite gateway;

a second transceiver for communicating with a terrestrial communications network; and

a processor, responsive to one of a user selected protocol or a gateway selected protocol, for enabling either said first or said second transceiver for registering said user terminal with one of said satellite communications network or said terrestrial communications network, wherein one of said satellite communications network or terrestrial communications network is assigned a higher priority than the other for first attempting registration, and wherein said satellite gateway instructs said user terminal to seek another system while remaining registered with the highest priority network.

11. A dual mode user terminal, comprising:

a first transceiver for communicating with a satellite communications network that comprises at least one satellite and at least one satellite gateway;

a second transceiver for communicating with a terrestrial communications network; and

a processor, responsive to one of a user selected protocol or a gateway selected protocol, for enabling either said first or said second transceiver for registering said user terminal with one of said satellite communications network or said terrestrial communications network, wherein one of said satellite communications network or terrestrial communications network is assigned a higher priority than the other for first attempting registration, and wherein said satellite gateway instructs said user terminal to switch to another system while remaining registered with the highest priority network.

If the user's landline phone number has call routing priority, the PCC 101 sends a call forwarding message to the cordless base station 115 to forward the user's landline phone number for the cellular phone number of the PCC 101 at block 531. If the PCC 101 is unable to establish communication with the cordless base station 115, the PCC 101 can perform the call forwarding by making a cellular telephone call. Thus, an incoming call routed to the user's landline phone number is forwarded to the cellular phone number of the PCC 101 located in the cellular telephone system 103.

Detailed Description Text (26):
Since at least two systems coexist (the conventional cellular system and the cordless system) and can have overlapping radio coverage, it is important that a priority hierarchy be established. The cordless system is expected to be a lower cost system than the conventional cellular system because it is attached via the user's home landline connection to the TELCO public switched telephone network by conventional wire. It is most likely that the cordless system would be the preferred system when the PCC 101 is within the coverage area of the cordless base station 115. Therefore, in the preferred embodiment, priority is given to the cordless base service. However, the user may select other hierarchy of priority if desired.

Detailed Description Text (27):
The cordless base station 115 transmits an outbound signalling message on a radio channel which is selected to be noninterfering with radio channels in use in the local cellular system 103. This message is similar to that transmitted in the conventional system in that its purpose is to present the identity of the cordless system and aid the PCC 101 in determining its availability. The format of the message outbound from the cordless base station 115 on its signalling channel is shown in FIG. 7. In the preferred embodiment, information is transmitted in words on a radio channel from the cordless base station 115. Each word contains a known predetermined sequence of data bits (S) for synchronization followed by the data bits conveying the message (MSG). Optionally, a word also contains a dotting sequence (D) which precedes the synchronization sequence. Words are repeatedly transmitted on the channel. The dotting and synchronization are transmitted in NRZ while the message is transmitted in Manchester. When scanning, the PCC 101 locks onto a particular channel which may contain information transmitted by the cordless base station 115. If it is not able to decode a word within the time to transmit a certain number of words, it assumes that data is not present on the channel and continues with the scanning process. Since the PCC may arrive on the channel in the middle of a word, it must be on overlapping radio coverage, it is important that a priority hierarchy be established. The cordless system is expected to be a lower cost system than the conventional cellular system because it is attached via the user's home landline connection to the TELCO public switched telephone network by conventional wire. It is most likely that the cordless system would be the preferred system when the PCC 101 is within the coverage area of the cordless base station 115. Therefore, in the preferred embodiment, priority is given to the cordless base service. However, the user may select other hierarchy of priority if desired.

Detailed Description Text (30):
To provide better security and interference protection, the BID is continuously transmitted subaudibly on the voice channel when voice communication is occurring. The PCC 101 receives and decodes the BID and checks for a match between the subaudibly transmitted BID and the BID of its associated cordless base station 115. So long as the BIDs match, the conversation on the voice channel may continue. Upon detection of a mismatch, the PCC 101 received audio is muted and the PCC transmitter 403 is unkeyed. After a predetermined period of improper BID reception by the PCC 101 and a subsequent lack of received transmission from the PCC 101 to the cordless base station 115, the call is terminated.

Detailed Description Text (31):
Given that the priority established for the PCC 101 is that the cordless base station 115 is the first desired path for a user's telephone call and the conventional cellular (or the microcell system) is the second choice, the process of implementing that priority is shown in FIG. 14. The depiction in FIG. 14 is of the PCC receiver's 401 reception of the outbound signalling channel or set of signalling channels transmitted from the cellular system, the cordless base, and the

microcellular system relative to time. This diagram aids in the understanding of the scanning priority employed in the preferred embodiment of the present invention.

Detailed Description Text (34):
The effect of this priority process is to give priority to the cordless base station 115 at the PCC 101. Once the signalling channel of the cordless base station 115 is discovered, the PCC 101 remains tuned to this channel. Thus, when the PCC 101 is initially tuned to the cellular system it will automatically switch to the cordless base station when it is possible to access the cordless base station. Once the PCC receiver 401 has found the cordless base signalling sub-data channel, it remains tuned to that channel. When the PCC transceiver is first turned on, its first scan of signalling sub-data channels is the preestablished signalling channel or channels of the cordless base station 115. Of course, the user may override the automatic priority scanning hierarchy by entering an override code into the PCC 101. In this manner, the user may force the scanning of the cellular system signalling channels only, the cordless base signalling channels only, the microcellular system signalling channels only, or combinations of the systems. The user may also perform a call origination with a one time override to the system of his choice.

Detailed Description Text (36):
Turning now to FIGS. 11, 12, and 13, the process followed by the PCC 101 in realizing the scan priority is shown in a flow diagram. This process is executed by the microprocessor 409 from its operating program stored in ROM memory 421. Upon power-on, at 1101, the radio sets the cellular scan counter to 0. This variable is utilized to ensure that excessive word synchronization losses or other reasons for excessive cellular rescans do not prevent the PCC 101 from scanning for the cordless base station 115 channels. After resetting the cellular scan counter, the predetermined signalling channel (or channels) of the cordless base station 115 is scanned at 1103 to determine if the PCC 101 is within range of a cordless base station, whether the signalling channel received has the proper BID, and potentially whether the signalling channel has sufficient signal quality. The PCC 101 decides if all the criteria have been met at 1105. If the criteria have been met, the cordless mode of operation is entered and the user is notified by illumination of the LED associated with the cordless mode, at 1107. The PCC transceiver remains in the mode of processing cordless functions, at 1109, including monitoring the cordless base signalling channel, making and receiving radiotelephone calls, and effecting channel change (handoff) between itself and the cordless base, until synchronization or BID is lost between the PCC 101 transceiver and the cordless base station 115 (as detected at 1111).

Current US Original Classification (1):
455/426

L10: Entry 34 of 34 File: USPT Mar 7, 1995

DOCUMENT-IDENTIFIER: US 5396539 A
TITLE: Cellular data overlay system for storing data identifying selected data allocated channels

Brief Summary Text (19):
Accordingly, the invention improves channel utilization by sending data on voice channels. Moreover, the invention assigns a higher priority to voice service and accordingly controls data service by limiting channel access by the latter service to only those times when the channels are not being used for voice service. This approach avoids interference with primary voice service, yet it provides materially greater utilization of the overall channel capacity of the system by making use of otherwise inactive interludes in the voice channels.

Detailed Description Text (6):
The remote units 20a, 20b are depicted as mounted in automobiles, although other portable radio telephones, such as, for example, hand-held units and even non-portable wireless terminals (for example, security and control/monitoring units), fall within the scope of the invention.

Current US Original Classification (1):
455/426